

REMARKS

The final Office Action of November 1, 2006, has been received and reviewed.

Claims 1-33 are currently pending and under consideration in the above-referenced application. Each of claims 1-33 stands rejected.

Reconsideration of the above-referenced application is respectfully requested.

Rejections under 35 U.S.C. § 102

Claims 1-5, 7-25, and 31-33 stand rejected under 35 U.S.C. § 102(e) for reciting subject matter which is purportedly anticipated by that described in U.S. Patent 6,340,846 to LoBianco et al. (hereinafter “LoBianco”).

A claim is anticipated only if each and every element, as set forth in the claim, is found, either expressly or inherently described, in a single reference which qualifies as prior art under 35 U.S.C. § 102. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Independent claim 1 is drawn to a method that includes, among other things, “applying substantially a predetermined volume of adhesive material to an active surface of a first semiconductor device; and positioning a second semiconductor device adjacent to the first semiconductor device, the adhesive material...spacing a surface of the second semiconductor device a permanent, predetermined distance apart from the active surface of the first semiconductor device.”

The method of independent claim 16 similarly includes “applying substantially a predetermined volume of adhesive material onto at least a surface of [a] first semiconductor device; and positioning a second semiconductor device adjacent to the first semiconductor device, the adhesive material...spacing the surface of the second semiconductor device substantially a predetermined distance apart from the surface of the first second semiconductor device.”

LoBianco describes a stacked multi-chip package. A first die 14 is secured to the top surface of a substrate 12 with an adhesive layer 13. Col. 3, lines 50-55; FIG. 3. Conductive

wires 38 are formed to electrically connect bond pads of the die 14 and corresponding terminals of the substrate 12. Col. 3, lines 56-61; FIG. 3. A “measured quantity” of fluid adhesive 40 is then dispensed onto the top of the first die 14. Col. 3, line 62, to col. 4, line 11; FIG. 3. A second die 16 is pressed down on the adhesive 40 until a desired bond line, or adhesive layer 42, thickness and uniform lateral dispersal of the adhesive are obtained. Col. 4, lines 27-29; FIG. 5.

Although LoBianco explains that the fluid adhesive 40 is dispensed in “a measured quantity” (col. 3, lines 62-65), LoBianco does not expressly or inherently describe that the adhesive material spaces a surface of a second semiconductor device “a predetermined distance” apart from the active surface of a first semiconductor device. Rather, as the Office has already acknowledged, the method described in LoBianco requires the additional act of pressing the second die 16 down on the adhesive 40 “until a desired bond line, or adhesive layer 42, thickness and uniform lateral dispersal of the adhesive are obtained.” Office Action of November 1, 2006, page 8, citing LoBianco, col. 4, lines 28-42. As some of the adhesive 40 is laterally dispersed from between the dice 14 and 16, it is not the “measured quantity” of adhesive 40 that spaces the dice 14 and 16 the predetermined distance apart from one another but, rather, the act of pressing and the adhesive 40 that remains between the dice 14 and 16 following the act of pressing that defines the predetermined distance.

Furthermore, in view of the foregoing, it is evident that the “measured quantity” of adhesive 40 described in LoBianco merely temporarily spaces adjacent dice 14 and 16 a fixed distance apart from each other. The distance that the dice are to be permanently spaced apart from one another is fixed by the act of pressing. Therefore, the “measured quantity” of adhesive 40 does not *permanently* space opposed surfaces of adjacent semiconductor devices a predetermined distance apart from one another, as required by the methods of both independent claim 1 and independent claim 16, as proposed to be amended.

Therefore, LoBianco does not anticipate each and every element of amended independent claim 1 or amended independent claim 16, as would be required to maintain the 35 U.S.C. § 102(e) rejections of these claims.

Claims 2-5 and 7-15 are each allowable, among other reasons, for depending directly or indirectly from independent claim 1, which is allowable.

Claim 4 is additionally allowable since LoBianco neither expressly nor inherently describes “placing [a] second semiconductor device on . . . discrete conductive elements.” To the contrary, LoBianco quite clearly discloses that “the adhesive 40 [is] thick enough to prevent the bottom surface of the second die [16] from contacting any of the . . . conductive wires 38 extending over the top surface of the first die 14.” Col. 4, lines 33-36.

Claim 5 is further allowable because LoBianco does not expressly or inherently describe introducing adhesive material between first and second semiconductor devices. Instead, the disclosure of LoBianco is limited to introducing adhesive 40 onto the top surface of semiconductor die 14, without any mention that semiconductor die 16 is in proximity to semiconductor die 14, let alone already positioned over semiconductor die 14. Thus, when the adhesive 40 is introduced in accordance with the disclosure of LoBianco, it is not introduced *between* the dice 14 and 16.

Each of claims 17-25 and 31-33 is allowable, among other reasons, for depending directly or indirectly from independent claim 16, which is allowable.

Claim 19 is further allowable because LoBianco does not expressly or inherently describe applying adhesive material after a second semiconductor device (e.g., semiconductor die 16) is positioned adjacent to a first semiconductor device (e.g., semiconductor die 14). Instead, the disclosure of LoBianco is limited to applying adhesive 40 onto the top surface of semiconductor die 14 before semiconductor die 16 is positioned adjacent to semiconductor die 14.

Claim 25 is also allowable since LoBianco includes no express or inherent description of using a predetermined volume of adhesive material to draw one semiconductor device toward another until the devices are spaced substantially a set distance apart from each other. Rather, the disclosure of LoBianco is limited to *pressing* semiconductor die 16 against adhesive 40 and die 14 to define a distance that the dice 14 and 16 are spaced apart from one another. *See, e.g.,* col. 4, lines 28-42. This is akin to the difference between pulling and pushing -- they are opposites.

It is respectfully requested that the 35 U.S.C. § 102(e) rejections of claims 1-5, 7-25, and 31-33 be withdrawn and that each of these claims be allowed.

Rejections under 35 U.S.C. § 103(a)

Claims 6 and 26-30 are rejected under 35 U.S.C. § 103(a) for being drawn to subject matter that is allegedly unpatentable over the subject matter taught in LoBianco, in view of teachings from U.S. Patent 6,555,917 to Heo (hereinafter “Heo”).

The standard for establishing and maintaining a rejection under 35 U.S.C. § 103(a) is set forth in M.P.E.P. § 706.02(j), which provides:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant’s disclosure.
In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 6 is allowable, among other reasons, for depending indirectly from independent claim 1, which is allowable.

Claims 26-30 are each allowable, among other reasons, for depending directly or indirectly from independent claim 16, which is allowable.

Moreover, it is respectfully submitted that there are at least two reasons that teachings from LoBianco and Heo cannot be relied upon to establish a *prima facie* case of obviousness against any of claims 6 or 26-30.

First, it is respectfully submitted that, without the benefit of hindsight provided by the claims of the above-referenced application, one of ordinary skill in the art wouldn’t have had any reason to combine teachings from LoBianco and Heo in the asserted manner. That is because LoBianco teaches assemblies in which the distance that adjacent dice 14 and 16 are spaced apart from one another is defined by pressing (col. 4, lines 28-42) and the adhesive material 40 that

remains between the dice 14 and 16 following the act of pressing, whereas Heo teaches that such a distance is defined by metal bumps 32 and 34 (or solder balls) that electrically connect bond pads of adjacent chips 10-1 and 10-2 to one another.

Second, it is respectfully submitted that, in view of these different techniques for spacing semiconductor devices apart from one another, one of ordinary skill in the art would have no reason to expect that the method taught in LoBianco and the methods taught in Heo could be successfully combined.

Third, it is respectfully submitted that, since Heo teaches that metal bumps 32 and 34 are in place between adjacent chips 10-1 and 10-2 as underfill material is injected between the chips 10-1 and 10-2, and that the metal bumps 32 and 34 define the distance that the chips 10-1 and 10-2 are spaced apart (col. 4, line 66, to col. 5, line 1), Heo, like Lo Bianco, lacks any teaching or suggestion that adhesive material may force the surface of a semiconductor device away from another semiconductor device, as required by claims 6 and 29.

Therefore, it is respectfully submitted that, under 35 U.S.C. § 103(a), claims 6 and 26-30 recite subject matter that is allowable over the teachings of LoBianco and Heo.

Withdrawal of the 35 U.S.C. § 103(a) rejections of claims 6 and 26-30 is respectfully requested, as is the allowance of each of these claims.

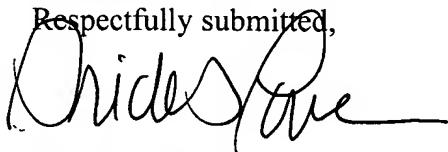
Entry of Amendments

It is respectfully requested that the proposed claim amendments be entered. The proposed amendments do not introduce new matter into the application, nor would they require an additional search. Rather, the proposed amendments have been made merely for the sake of clarity. In the event that a decision is made not to enter the proposed claim amendments, entry thereof upon the filing of a Notice of Appeal in the above-referenced application is respectfully requested.

CONCLUSION

It is respectfully submitted that each of claims 1-33 is allowable. An early notice of the allowability of each of these claims is respectfully solicited, as is an indication that the above-referenced application has been passed for issuance. If any issues preventing allowance of the above-referenced application remain which might be resolved by way of a telephone conference, the Office is kindly invited to contact the undersigned attorney.

Respectfully submitted,



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